

Amendments to the Claims

This listing of the claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

Claims 1-380 (canceled)

381. (currently amended) A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

an IP transfer network contains two, or more connection servers, and media routers outside said IP transfer network are each connected to terminals having a transmittance and reception function of digital media;

based on a call setting request from a terminal calling side;

a call setting IP packet is transmitted from a media router on telephone calling side to a connection server on telephone calling side;

said connection server provided on the telephone calling side determines both an IP communication line for an inter-terminal communication within said IP transfer network and a circuit identification code (CIC) for identifying said communication line by employing both a telephone number provided on the telephone calling side and a telephone number provided on the call reception side, and produces an initial address message (IAM) containing said circuit identification code;

said produced initial address message is transmitted to the connection server provided on the call reception side, said connection server on the call reception side transmits a call setting IP packet to the media router on the call reception side, and said media router on the call reception side transmits said call setting IP packet via a media router, a terminal on the call reception side;

said connection server on the call reception side produces an address completion message (ACM);

said address completion message is transmitted to said connection server on the telephone calling side;

when a report of telephone calling operation is received from the media router on the call reception side, said connection server on the call reception side produces a call progress message (CPG); said call progress message reaches to said connection server on the telephone calling side; and said connection server on the calling side transmits the report of telephone calling operation of the media router on the call reception side to the media router on the telephone calling side;

upon receipt of a response issued from the media router on the call reception side, said connection server on the call reception side produces an answering message (ANM); said answering message reaches to said connection server on the telephone calling side; said connection server on the telephone calling side stops a calling signal of the media router on the call reception side; both said terminal on the telephone calling side and said terminal on the call reception side can establish an inter-terminal communication, through both the media router calling side and the media router reception side, to transmit and receive the digital media via said media routers provided on the telephone calling side and the call reception side;

a request for interrupting the inter-terminal communication is transmitted from said media router provided on either the telephone calling side or the call reception side to said connection server; a release request message (REL) is sent from said connection server to another connection server; an interrupt instruction is transmitted from said another connection server to another media router, and on the other hand, a release completion message (RLC) is transmitted from another connection server to said server; and an interrupt completion is sent to a media router so as to release the inter-terminal communication between the two terminals[. . .];

wherein an initial address message (IAM), a call progress message (CPG), an answering message (ANM), a release message (REL), and a release completion message (RLC) are transmitted/received between said connection server on the telephone calling side and said connection server on the call reception side, and an address completion message (ACM) is omitted.

382-466. (canceled)

467. (new): A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

 said IP transfer network includes plural network node apparatus, plural connection servers, plural proxy connection servers and a domain name server,

 plural terminals are connected to said IP transfer network, a terminal T1 is connected to a network node apparatus N1 by a logical terminal LP1 via a communication line L1, a terminal T2 is connected to a network node apparatus N2 by a logical terminal LP2 via a communication line L2, and said domain name server holds a set of a telephone number TN_j (j=1,2,3, ...) of a terminal T_j, an internal IP address IA_j being a discrimination information of a logical terminal LP_j and an internal IP address k of a connection server Sk carrying out a connection control of said terminal T_j,

 an IP communication record R81 including a discrimination information of said logical terminal LP1 is set in said network node apparatus N1, and an IP communication record R82 including a discrimination information of said logical terminal LP2 is set in said network node apparatus N2,

 said terminal T1 transmits an external IP packet 1 for connecting to said terminal T2, wherein said external IP packet 1 includes a connection request and said telephone numbers TN1 and TN2 and a destination address thereof is an external IP address EA81 of a proxy connection server PS1,

 said network node apparatus N1 inspects an IP encapsulation condition to be satisfied by an external IP address in said external IP packet 1 according to a rule of said IP communication record R81,

 said external IP packet 1 which said IP encapsulation condition is not satisfied is discarded,

 when said IP encapsulation condition is satisfied, said network node apparatus N1 forms a first type internal IP packet 11 by encapsulating said external IP packet 1 and sends it, a destination address of said internal IP packet 11 is an internal IP address IA81 of said

proxy connection server PS1, said proxy connection server PS1 converts said internal IP packet 11 into a second type internal IP packet 12 and sends it to a connection server S1,

said connection server S1 obtains said telephone numbers TN1 and TN2 and said external IP address EA1 from said internal IP packet 12, and further obtains an external IP address EA2 of said terminal T2, an internal IP address IA2 being a discrimination information of said logical terminal LP2 and an internal IP address IA92 of said connection server S2 carrying out a connection control of said terminal T2 by presenting said telephone number TN2 of said destination terminal T2 to a domain name server DS1,

said connection server S1 sends an initial address message (IAM) including said connection request to said connection server S2, said connection server S2 obtains said telephone numbers TN1 and TN2, said external IP address EA1 and EA2 and said internal IP address IA1 and IA2 from said initial address message (IAM), said connection server S2 sends a second type internal IP packet 21 including a receipt notification, said internal IP packet 21 is converted into a first type internal IP packet 22 by a proxy connection server PS2, said internal IP packet 22 is converted into an external IP packet 2 including said receipt notification at said network node apparatus N2, said external IP packet 2 reaches at said terminal T2, and said connection server S2 forms an address completion message (ACM) including a receipt propriety notification and sends it to said connection server S1,

said terminal T2 transmits an external IP packet 3 that includes a call-on notification for notifying a response preparation start and a destination address thereof is an external IP address EA82 of a proxy connection server PS2, an external IP address of said external IP packet 3 is judged at said network node apparatus N2 according to an IP encapsulation condition defined by said IP communication record R82, said external IP address becomes to a first type internal IP packet 31 including said call-on notification, and then becomes to a second type internal IP packet 32 and reaches at said connection server S2,

said connection server S2 forms a call progress message (CPG) including said call-on notification and sends it to said connection server S1, said connection server S1 sends a second type internal IP packet 41 including said call-on notification, said internal

IP packet 41 becomes to a first type internal IP packet 42 and becomes to an external IP packet 4 including said call-on notification at said network node apparatus N1, and said external IP packet 4 reaches at said terminal T1,

 said terminal T2 transmits an external IP packet 5 including a response notification for notifying a response and a port number PN2 of said terminal T2, an IP encapsulation condition of said external IP packet 5 is judged at said network node apparatus N2 and becomes to a first type internal IP packet 51 including said response notification, said internal IP packet 51 becomes to a second type internal IP packet 52 and reaches at said connection server S2, said connection server S2 forms a response message including said response notification and said port number PN2 and sends it to said connection server S1, said connection server S1 sends a second type internal IP packet 61 including said response notification, an external IP address EA2 of said terminal T2 and said port number PN2, said internal IP packet 61 becomes a first type internal IP packet 62, said internal IP packet 62 becomes to an external IP packet 6 including said response notification, an external IP address EA2 of said terminal T2 and said port number PN2 and then reaches at said terminal T1,

 said connection server S2 commands a setting of an IP communication record R2 including a discrimination information of said logical terminal LP2 for said network node apparatus N2, said connection server S1 commands a setting of an IP communication record R1 including a discrimination information of said logical terminal LP1 for said network node apparatus N1, said IP communication records R1 and R2 define a communication path P12 for transferring an internal IP packet between said network node apparatus N1 and N2,

 when said terminal T1 transmits an external IP packet 7 that a source address is said external IP address EA1, a destination address is said external IP address EA2 of said terminal T2 and a destination port number is said port number PN2, said external IP packet 7 is judged at network node apparatus N1 whether an IP encapsulation condition is satisfied based on administration of said communication record R1 or not,

 when said IP encapsulation condition is satisfied, said external IP packet 7 is capsulated, said capsulated packet becomes to an internal IP packet 7 that a destination address is said internal IP address IA2 for discriminating said logical terminal LP2 and is

transferred in said communication path P12, and it is reversely capsulated at said network node apparatus N2 and then a restored external IP packet 7 is sent to said terminal T2, and

when said terminal T1 transmits an external IP packet 9 that includes a communication cutting-off request and a destination address is said external IP address EA81, said external IP packet 9 becomes to an internal IP packet 9 including said communication cutting-off request and then reaches at said connection server S1, said connection servers S1 and S2 send/receive a release message or a release completion message (RLC) and command a disappear of said communication records R1 and R2.

468. (new): A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

said IP transfer network includes plural termination gateways GW, said termination gateways GW respectively include plural network node apparatus and a domain name server,

plural terminals are connected to said IP transfer network, a terminal T1 is connected to a network node apparatus N1 in a termination gateway GW1 by a logical terminal LP1 via a communication line L1, a terminal T2 is connected to a network node apparatus N2 in a termination gateway GW2 by a logical terminal LP2 via a communication line L2, and said domain name server holds a set of a telephone number TN_j (j=1, 2,3, ...) and an external IP address EA_j of a terminal T_j, an internal IP address IA_j being a discrimination information of a logical terminal LP_j and an internal IP address k of a termination gateway GW_k carrying out a connection control of said terminal T_j,

an IP communication record R81 including a discrimination information of said logical terminal LP1 is set in said network node apparatus N1, and an IP communication record R82 including a discrimination information of said logical terminal LP2 is set in said network node apparatus N2,

said terminal T1 transmits an external IP packet 1 for connecting to said terminal T2, wherein said external IP packet 1 includes a connection request and said telephone number TN2 and a destination address thereof is a connection control request address

EA81 which is an address for transmitting an external IP packet on a connection control of said termination gateways GW,

said network node apparatus N1 inspects an IP encapsulation condition define by said IP communication record R81 for an external IP address in said external IP packet 1,

said external IP packet 1 which said IP encapsulation condition is not satisfied is discarded,

when said IP encapsulation condition is satisfied, said network node apparatus N1 converts said external IP packet 1 into an internal IP packet 1 by a encapsulation,

said termination gateway GW1 obtains said telephone numbers from said internal IP packet 1, and further obtains an external IP address EA2 of said terminal T2, an internal IP address IA2 being a discrimination information of said logical terminal LP2 and an internal IP address IA92 of said termination gateway GW2 carrying out a connection control of said terminal T2 by using said domain name server DS1,

said termination gateway GW2 obtains said connection request, said telephone numbers TN1 and TN2, said external IP address EA1 and EA2 and said internal IP address IA1 and IA2 from an initial address message (IAM), said termination gateway GW2 sends an internal IP packet 2 including a receipt notification, said internal IP packet 2 is converted into an external IP packet 2 at said network node apparatus N2, said external IP packet 2 reaches at said terminal T2, and said termination gateway GW2 forms an address completion message (ACM) including a receipt propriety notification and sends it to said termination gateway GW1,

said terminal T2 transmits an external IP packet 3 that includes a call-on notification for notifying a response preparation start and a destination address thereof is a connection control request address EA82, said external IP packet 3 is judged at said network node apparatus N2 whether an IP encapsulation condition defined by said IP communication record R82 is satisfied or not,

when said IP encapsulation condition is satisfied, said external IP packet 3 becomes to an internal IP packet 3 including said call-on notification and then inputs to said termination gateway GW2,

said termination gateway GW2 sends a call progress message (CPG) including said call-on notification to said termination gateway GW1, said termination gateway

GW1 sends an internal IP packet 4 including said call-on notification, said internal IP packet 4 becomes to an external IP packet 4 including said call-on notification at said network node apparatus N1 and reaches at said terminal T1,

said external IP packet 5 is judged whether said IP encapsulation condition is satisfied or not,

when said IP encapsulation condition is satisfied, said external IP packet 5 becomes to an internal IP packet 5 including said call-on notification and then inputs to said termination gateway GW2, said termination gateway GW2 sends a response message including said response notification to said termination gateway GW1, said termination gateway GW1 sends an internal IP packet 6 including said response notification and an external IP address EA2 of said terminal T2, said internal IP packet 6 becomes to an external IP packet 6 including said response notification and said external IP address EA2 of said terminal T2 at said network node apparatus N1 and then reaches at said terminal T1,

said termination gateway GW2 presents a setting of an IP communication record R2 including a discrimination information of said logical terminal LP2 for said network node apparatus N2, said termination gateway GW1 presents a setting of an IP communication record R1 including a discrimination information of said logical terminal LP1 for said network node apparatus N1, said IP communication records R1 and R2 define a communication path P12 for transferring an internal IP packet between said network node apparatus N1 and N2,

when said terminal T1 transmits an external IP packet 7 that a destination address is said external IP address EA2 of said terminal T2, said external IP packet 7 inputs to said network node apparatus N1, said external IP packet 7 is judged whether an IP encapsulation condition is satisfied or not,

when said IP encapsulation condition is satisfied, said external IP packet 7 is converted into an internal IP packet 7 that a destination address is said internal IP address IA2 for discriminating said logical terminal LP2 and is transferred in said communication path P12,

when said internal IP packet 7 reaches at said network node apparatus N2, it is restored to said external IP packet 7 and then reaches at said terminal T2, and

when said terminal T1 transmits an external IP packet 9 that includes a communication cutting-off request and a destination address is said connection control request address EA81, said external IP packet 9 becomes to an internal IP packet 9 including said communication cutting-off request at said network node apparatus N1 and then inputs to said termination gateway GW1, and said termination gateways GW1 and GW2 send/receive a release message or a release completion message (RLC) and command a disappear of said IP communication records R1 and R2.

469. (new): A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

 said IP transfer network includes plural network node apparatus, a connection server X, plural proxy connection servers and a domain name server X,

 plural terminals are connected to said IP transfer network, a terminal T1 having a telephone number TN1 is connected to a network node apparatus N1 by a logical terminal LP1 via a communication line L1, a terminal T2 having a telephone number TN2 is connected to a network node apparatus N2 by a logical terminal LP2 via a communication line L2, and said domain name server X holds a set of a telephone number TN_j (j=1, 2, 3, ...) and an external IP address EA_j of a terminal T_j and an internal IP address IA_j being a discrimination information of a logical terminal LP_j,

 an IP communication record R81 including a discrimination information of said logical terminal LP1 is set in said network node apparatus N1, and an IP communication record R82 including a discrimination information of said logical terminal LP2 is set in said network node apparatus N2,

 said terminal T1 transmits an external IP packet 1 for connecting to said terminal T2, wherein said external IP packet 1 includes a connection request and said telephone numbers TN2 and a destination address thereof is an external IP address EA81 of a proxy connection server PS1,

 said external IP packet 1 inputs to said network node apparatus N1 from said logical terminal LP1,

said network node apparatus N1 inspects an IP encapsulation condition defined by a rule of said IP communication record R81 for an external IP address in said external IP packet 1,

said external IP packet 1 which said IP encapsulation condition is not satisfied is discarded,

when said IP encapsulation condition is satisfied, said network node apparatus N1 forms a first type internal IP packet 11 by encapsulating said external IP packet 1 and sends it, a destination address of said internal IP packet 11 is an internal IP address IA81 of said proxy connection server PS1, said proxy connection server PS1 converts said internal IP packet 11 into a second type internal IP packet 12 and sends it to a connection server X,

said connection server X obtains said telephone numbers TN1 and TN2 from said internal IP packet 12, and further obtains an external IP address EA2 of said terminal T2 and an internal IP address IA2 being a discrimination information of said logical terminal LP2 by presenting said telephone number TN2 to a domain name server DS1,

said connection server X sends a second type internal IP packet 21 including a receipt notification, said internal IP packet 21 is converted into a first type internal IP packet 22 by a proxy connection server PS2, said internal IP packet 22 is converted into an external IP packet 2 including said receipt notification at said network node apparatus N2 , and said external IP packet 2 reaches at said terminal T2,

said terminal T2 transmits an external IP packet 3 that includes a call-on notification for notifying a response preparation start and a destination address thereof is an external IP address EA82 of a proxy connection server PS2, said external IP packet 3 is judged at said network node apparatus N2 whether it satisfies an IP encapsulation condition defined by said IP communication record R82 or not, said external IP packet 3 becomes to a first type internal IP packet 31 including said call-on notification, and then becomes to a second type internal IP packet 32 and reaches at said connection server X,

said connection server X sends a second type internal IP packet 41 including said call-on notification, said internal IP packet 41 becomes to a first type internal IP packet 42, and said internal IP packet 42 becomes to an external IP packet 4 including said call-on notification at said network node apparatus N1 and then reaches at said terminal T1,

said terminal T2 transmits an external IP packet 5 including a response notification for notifying a response, an IP encapsulation condition of said external IP packet 5 is judged at said network node apparatus N2 and becomes to a first type internal IP packet 51 including said response notification, said internal IP packet 51 becomes to a second type internal IP packet 52 and reaches at said connection server X, said connection server X sends a second type internal IP packet 61 including said response notification and said external IP address EA2, said internal IP packet 61 becomes to a second type internal IP packet 62, said internal IP packet 62 becomes to an external IP packet 6 including said response notification and said external IP address EA2 and then reaches at said terminal T1,

said connection server X commands a setting of an IP communication records R1 and R2 including discrimination information of said logical terminals LP1 and LP2 for said network node apparatus N1 and N2, said IP communication records R1 and R2 define a communication path P12 for transferring an internal IP packet between said network node apparatus N1 and N2,

when said terminal T1 transmits an external IP packet 7 that a destination address is said external IP address EA2 of said terminal, said external IP packet 7 is judged at network node apparatus N1 whether an IP encapsulation condition is satisfied based on administration of said IP communication record R1 or not,

when said IP encapsulation condition is satisfied, said external IP packet 7 is capsulated, said capsulated packet becomes to an internal IP packet 7 that a destination address is said internal IP address IA2 for discriminating said logical terminal LP2 and is transferred in said communication path P12, and it is reversely capsulated at said network node apparatus N2 and then a restored external IP packet 7 is sent to said terminal T2, and

when said terminal T1 transmits an external IP packet 9 that includes a communication cutting-off request and a destination address is said external IP address EA81, said external IP packet 9 becomes to an internal IP packet 9 including said communication cutting-off request and then reaches at said connection server X, and a disappear of said communication records R1 and R2 is commanded.

470. (new): A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein: said IP transfer network includes plural network node apparatus, plural connection servers and a domain name server, a terminal T1 outside of said IP transfer network is connected to a network node apparatus N1 by a logical terminal LP1 via a communication line L1, and a terminal T2 outside of said IP transfer network is connected to a network node apparatus N2 by a logical terminal LP2 via a communication line L2,

 said terminal T1 transmits an external IP packet 1 for connecting to said terminal T2, wherein said external IP packet 1 includes a connection request and a telephone number TN2 of said terminal T2 and a destination address thereof is an address of a connection server S1,

 said external IP packet 1 inputs to said network node apparatus N1 from logical terminal LP1, and an IP encapsulation condition is inspected according to a rule of said IP communication record R81,

 when said IP encapsulation condition is satisfied, said external IP packet 1 becomes to an internal IP packet 1 and then reaches at said connection server S1,

 said connection server S1 obtains an external IP address EA2 of said terminal T2, an internal IP address IA2 for discriminating said logical terminal LP2 and an internal IP address 2 of said connection server S2 carrying out a connection control of said terminal T2 by presenting said telephone number TN2 to a domain name server DS1, and sends an initial address message (IAM) including said connection request to said connection server S2,

 when said connection server S2 sends an internal IP packet 2 including a connection request notification, said internal IP packet 2 is converted into an external IP packet 2 according to a rule of an IP communication record R82 in said network node apparatus N2 and then is sent to said terminal T2,

 an external IP packet 3 including said call-on notification is sent from said terminal T2, said external IP packet 3 is converted into an internal IP packet 3 at said network node apparatus N2 according to a rule of said IP communication record R82 and then reaches at said connection server S2, and said connection server S2 forms a call

progress message (CPG) including said call-on notification and sends it to said connection server S1,

when said terminal T2 transmits an internal IP packet 4 including said call-on notification, said internal IP packet 4 is converted into an external IP packet 4 and then reaches at said terminal T1,

when an external IP packet 5 including a response notification from said terminal T2, said external IP packet 5 is converted into an internal IP packet 5 at said network node apparatus N2 and then reaches at said connection server S2, said connection server S2 forms a response message including said response notification and sends it to said connection server S1,

when said connection server S1 sends an internal IP packet 6 including said response notification and said external IP address EA2, said internal IP packet 6 reaches at said terminal T1, said connection servers S1 and S2 respectively command setting of IP communication records R1 and R2 including internal IP address IA1 and IA2 for discriminating said logical terminals LP1 and LP2 for said network node apparatus N1 and N2, and said IP communication records R1 and R2 define a communication path P12 for transferring an internal IP packet between said network node apparatus N1 and N2,

when said terminal T1 transmits an external IP packet 7 that a destination address is said external IP address EA2 of said terminal T2, said external IP packet 7 is judged at network node apparatus N1 whether an IP encapsulation condition is satisfied based on a rule of said IP communication record R1 or not, said external IP packet 7 becomes to an internal IP packet 7 that a destination address is said internal IP address IA2, and said internal IP packet 7 is transferred in said communication path P12, and an external IP packet 7 restored at network node apparatus N2 is sent to said terminal T2, and

when said terminal T1 transmits an external IP packet 9 that includes a communication cutting-off request and a destination address is an address of said connection server S1, said external IP packet 9 including said communication cutting-off request reaches at said connection server S1, said connection servers S1 and S2 send/receive a release message or a release completion message (RLC) and command a disappear of said communication records R1 and R2, and a transferring of said internal IP packet having said internal IP address IA1 and IA2 is stopped.

471. (new): A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein: said IP transfer network includes plural network node apparatus, plural connection servers and a domain name server,

a terminal T1 outside of said IP transfer network is connected to a network node apparatus N1 by a logical terminal LP1 via a communication line L1, and a terminal T2 outside of said IP transfer network is connected to a network node apparatus N2 by a logical terminal LP2 via a communication line L2,

said terminal T1 transmits an external IP packet 1 including a connection request and a telephone number TN2 of said terminal T2, said external IP packet 1 inputs to said network node apparatus N1 from said logical terminal LP1, said network node apparatus N1 sends said connection request and said telephone number TN2,

said connection server S1 obtains an external IP address EA2 of said terminal T2 and an IP address IA2 of said connection server S2 carrying out a connection control of said terminal T2 by presenting said telephone number TN2 to a domain name server DS1, said connection server S1 sends an initial address message (IAM) including said connection request to said connection server S2, and said connection server S2 sends a connection request notification to said terminal T2 having said external IP address EA2,

said terminal T2 transmits said response notification to said connection server S2, said connection server S2 sends said response notification to said connection server S1, and said connection server S1 sends said response notification to said terminal T1,

said connection servers S1 and S2 respectively command setting of IP communication records R1 and R2 including internal IP address IA1 and IA2 for discriminating said logical terminals LP1 and LP2 for said network node apparatus N1 and N2, and said IP communication records R1 and R2 define a communication path P12 for transferring an internal IP packet between said network node apparatus N1 and N2,

when said terminal T1 transmits an external IP packet 2 that a destination address is said external IP address EA2 of said terminal T2, said external IP packet 2 is judged at network node apparatus N1 whether an IP encapsulation condition is satisfied based on a rule of said IP communication record R1 or not, said external IP packet 2 becomes to an internal IP packet 2 that a destination address is said internal IP address IA2, and said

internal IP packet 2 is transferred in said communication path P12, and an external IP packet 2 restored at network node apparatus N2 is sent to said terminal T2, and

when said terminal T1 transmits a communication cutting-off request to said connection server S1, said connection servers S1 and S2 send/receive a release message or a release completion message (RLC) and command a disappear of said communication records R1 and R2, and a transferring of said internal IP packet having said internal IP address IA1 and IA2 is stopped.

472. (new): A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

said IP transfer network includes plural network node apparatus, plural connection servers, plural proxy connection servers and a domain name server,

plural terminals are connected to said IP transfer network , a terminal T1 is connected to a network node apparatus N1 by a logical terminal LP1 via a communication line L1, a terminal T2 is connected to a network node apparatus N2 by a logical terminal LP2 via a communication line L2, and said domain name server holds a set of a telephone number TN_j (j=1, 2,3, ...) and an external IP address EA_j of a terminal T_j, a discrimination information IA_j of a logical terminal LP_j and an internal IP address k of an internal address k carrying out a connection control of said terminal T_j,

an IP communication record R81 including a discrimination information of said logical terminal LP1 is set in said network node apparatus N1, and an IP communication record R82 including a discrimination information of said logical terminal LP2 is set in said network node apparatus N2,

said terminal T1 transmits an external IP packet 1 for connecting to said terminal T2, wherein said external IP packet 1 includes a connection request and said telephone numbers TN1 and TN2 and a destination address thereof is an external IP address EA81 of a proxy connection server PS1,

said network node apparatus N1 inspects a simple encapsulation condition defined by a rule of said IP communication record R81 for external IP address in said external IP packet 1, wherein said simple encapsulation is that a simple header without a source address is added to said external IP packet 1,

said external IP packet 1 which said simple encapsulation condition is not satisfied is discarded,

when said simple encapsulation condition is satisfied, said network node apparatus N1 forms a first type internal IP packet 11 by simply encapsulating said external IP packet 1 and sends it, a destination address of said internal IP packet 11 is an internal IP address IA81 of said proxy connection server PS1, and said proxy connection server PS1 converts said internal IP packet 11 into a second type internal IP packet 12 and sends it to a connection server S1,

said connection server S1 obtains said telephone numbers TN1 and TN2 and said external IP address EA1 from said internal IP packet 12, and further obtains an external IP address EA2 of said terminal T2, a discrimination information IA2 of said logical terminal LP2 and an internal IP address IA92 of said connection server S2 carrying out a connection control of said terminal T2 by presenting said telephone number TN2 of said destination terminal T2 to a domain name server DS1,

said connection server S1 sends an initial address message (IAM) including said connection request to said connection server S2, said connection server S2 obtains said telephone numbers TN1 and TN2, said external IP address EA1 and EA2 and said internal IP address IA1 and IA2 from said initial address message (IAM) , said connection server S2 sends a second type internal IP packet 21 including a receipt notification, said internal IP packet 21 is converted into a first type internal IP packet 22 by a proxy connection server PS2, said internal IP packet 22 is converted into an external IP packet 2 including said receipt notification at said network node apparatus N2, said external IP packet 2 reaches at said terminal T2, and said connection server S2 forms an address completion message (ACM) including a receipt propriety notification and sends it to said connection server S1,

said terminal T2 transmits an external IP packet 3 that includes a call-on notification for notifying a response preparation start and a destination address thereof is an external IP address EA82 of a proxy connection server PS2, an external IP address of said external IP packet 3 is judged at said network node apparatus N2 according to a simple encapsulation condition defined by said IP communication record R82, said external IP address becomes to a first type internal IP packet 31 including said call-on

notification, and then becomes to a second type internal IP packet 32 and then reaches at said connection server S2,

 said connection server S2 forms a call progress message (CPG) including said call-on notification and sends it to said connection server S1, said connection server S1 sends a second type internal IP packet 41 including said call-on notification, said internal IP packet 41 becomes to a first type internal IP packet 42 and becomes to an external IP packet 4 including said call-on notification at said network node apparatus N1, and said external IP packet 4 reaches at said terminal T1,

 said terminal T2 transmits an external IP packet 5 including a response notification for notifying a response and a port number PN2 of said terminal T2, a simple encapsulation condition of said external IP packet 5 is judged at said network node apparatus N2 and becomes to a first type internal IP packet 51 including said response notification, said internal IP packet 51 becomes to a second type internal IP packet 52 and reaches at said connection server S2, said connection server S2 forms a response message including said response notification and said port number PN2 and sends it to said connection server S1, said connection server S1 sends a second type internal IP packet 61 including said response notification, an external IP address EA2 of said terminal T2 and said port number PN2, said internal IP packet 61 becomes a first type internal IP packet 62, said internal IP packet 62 becomes to an external IP packet 6 including said response notification at said network node apparatus N1, and said external IP packet 6 reaches at said terminal T1,

 said connection server S2 commands a setting of an IP communication record R2 including a discrimination information of said logical terminal LP2 for said network node apparatus N2, said connection server S1 commands a setting of an IP communication record R1 including a discrimination information of said logical terminal LP1 for said network node apparatus N1, and said IP communication records R1 and R2 define a communication path P12 for transferring an internal IP packet between said network node apparatus N1 and N2,

 when said terminal T1 transmits an external IP packet 7 that a source address is said external IP address EA1, a destination address is said external IP address EA2 of said terminal T2 and a destination port number is said port number PN2, said external IP

packet 7 is judged at network node apparatus N1 whether a simple encapsulation condition is satisfied based on administration of said communication record R1 or not,

when said simple encapsulation condition is satisfied, said external IP packet 7 is simply encapsulated, said simply encapsulated packet becomes to an internal IP packet 7 that a destination address is an internal IP address IA2x defined based on said discrimination information IA2 of said logical terminal LP2 and is transferred in said communication path P12, and it is reversely and simply encapsulated at said network node apparatus N2 and then a restored external IP packet 7 is sent to said terminal T2, and

when said terminal T1 transmits an external IP packet 9 that includes a communication cutting-off request and a destination address is said external IP address EA81, said external IP packet 9 becomes to an internal IP packet 9 including said communication cutting-off request and then reaches at said connection server S1, said connection servers S1 and S2 send/receive a release message or a release completion message (RLC) and command a disappear of said communication records R1 and R2.

473. (new): A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

said IP transfer network includes plural network node apparatus, plural connection servers and a domain name server,

a terminal T1 outside of said IP transfer network is connected to a network node apparatus N1 by a logical terminal LP1 via a communication line L1, a terminal T2 outside of said IP transfer network is connected to a network node apparatus N2 by a logical terminal LP2 via a communication line L2,

said terminal T1 transmits an external IP packet 1 for connecting to said terminal T2 by using a telephone number, wherein said external IP packet 1 includes a connection request and a telephone number TN2 of said terminal T2, said external IP packet 1 inputs to said network node apparatus N1 from said logical terminal LP1, said network node apparatus N1 sends said connection request and said telephone number TN2 to a connection server X,

said connection server X obtains an external IP address EA2 of said terminal T2 by presenting said telephone number TN2 to said domain name server DS, said

connection server X sends a connection request notification to said terminal T2 having said external IP address EA2,

said terminal T2 transmits a response notification to said connection server X, and said connection server X sends said response notification to said terminal T1,

said connection server X commands a setting of IP communication records R1 and R2 including internal IP address IA1 and IA2 for discriminating said logical terminals LP1 and LP2 for said network node apparatus N1 and N2, and said IP communication records R1 and R2 define a communication path P12 for transferring an internal IP packet between said network node apparatus N1 and N2,

when said terminal T1 transmits an external IP packet 2 of which source address is said external IP address EA2, said external IP packet 2 is judged at network node apparatus N1 whether an IP encapsulation condition is satisfied or not,

when said IP encapsulation condition is satisfied, said external IP packet 2 becomes to an internal IP packet 2 of which destination address is said internal IP address IA2 and is transferred in said communication path P12, and an external IP packet 2 which is restored at said network node apparatus N2 is sent to said terminal T2, and

when said terminal T1 transmits a communication cutting-off request to said connection server X, said connection server X commands a disappear of said IP communication records R1 and R2, whereby said communication path P12 is disappeared and a transferring of internal IP packets in said communication path P12 is stopped.

474. (new): A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

said IP transfer network includes plural network node apparatus, plural connection servers and a domain name server,

a terminal T1 outside of said IP transfer network is connected to a network node apparatus N1 by a logical terminal LP1 via a communication line L1, a terminal T2 outside of said IP transfer network is connected to a network node apparatus N2 by a logical terminal LP2 via a communication line L2,

said terminal T1 transmits an external IP packet 1 for connecting to said terminal T2 by using a telephone number, wherein said external IP packet 1 includes a connection

request and a telephone number TN2 of said terminal T2, said external IP packet 1 inputs to said network node apparatus N1 from said logical terminal LP1, said network node apparatus N1 sends said connection request and said telephone number TN2 to a connection server X,

said connection server X obtains an external IP address EA2 of said terminal T2 by presenting said telephone number TN2 to said domain name server DS, said connection server X sends a connection request notification to said terminal T2 having said external IP address EA2,

said terminal T2 transmits a response notification to said connection server X, and said connection server X sends said response notification to said terminal T1,

said connection server X commands a setting of simple encapsulation communication records R1 and R2 including internal IP address IA1 and IA2 for discriminating said logical terminals LP1 and LP2 for said network node apparatus N1 and N2, and said simple encapsulation communication records R1 and R2 define a communication path P12 for transferring an internal IP packet between said network node apparatus N1 and N2,

when said terminal T1 transmits an external IP packet 2 of which source address is said external IP address EA2, said external IP packet 2 is judged at network node apparatus N1 whether a simple encapsulation condition is satisfied or not,

when said simple encapsulation condition is satisfied, said external IP packet 2 becomes to an internal IP packet 2 of which destination address is said internal IP address IA2 and is transferred in said communication path P12, and an external IP packet 2 which is restored at said network node apparatus N2 is sent to said terminal T2, and

when said terminal T1 transmits a communication cutting-off request to said connection server X, said connection server X commands a disappear of said simple encapsulation communication records R1 and R2, whereby said communication path P12 is disappeared and a transferring of internal IP packets in said communication path P12 is stopped.

475. (new): A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

said IP transfer network includes plural network node apparatus, plural connection servers and plural domain name servers,

a terminal T1 outside of said IP transfer network is connected to a network node apparatus N1 by a logical terminal LP1 via a communication line L1, a terminal T2 outside of said IP transfer network is connected to a network node apparatus N2 by a logical terminal LP2 via a communication line L2,

said terminal T1 transmits an external IP packet 1 for connecting to said terminal T2 by using a telephone number, wherein said external IP packet 1 includes a connection request and a telephone number TN2 of said terminal T2, said external IP packet 1 inputs to said network node apparatus N1 from said logical terminal LP1, said network node apparatus N1 sends said connection request and said telephone number TN2 to a connection server S1,

said connection server S1 obtains an external IP address EA2 of said terminal T2 and an internal IP address 2 of a connection server S2 carrying out a connection control of said terminal T2 by presenting said telephone number TN2 to said domain name server DS1, said connection server S1 sends an initial address message (IAM) including said connection request to said connection server S2, and said connection server S2 said connection request notification to said terminal T2 having said external IP address EA2,

said terminal T2 transmits a response notification to said connection server S2, said connection server S2 sends said response notification to said connection server S1, and said connection server S1 sends said response notification to said terminal T1,

said connection server S1 and S2 command a setting of simple encapsulation communication records R1 and R2 including identifiers IA1 and IA2 for discriminating said logical terminals LP1 and LP2 for said network node apparatus N1 and N2, and said simple encapsulation communication records R1 and R2 define a communication path P12 for transferring an internal IP packet between said network node apparatus N1 and N2,

when said terminal T1 transmits an external IP packet 2 of which source address is said external IP address EA2, said external IP packet 2 is judged at network node apparatus N1 whether a simple encapsulation condition is satisfied according to a rule of said simple encapsulation communication record R1 or not,

when said simple encapsulation condition is satisfied, said external IP packet 2 becomes to an internal IP packet 2 including said external IP packet 2 and said identifier IA2 and is transferred in said communication path P12, and an external IP packet 2 which is restored at said network node apparatus N2 is sent to said terminal T2, and

when said terminal T1 transmits a communication cutting-off request to said connection server S1 , said connection servers S1 and S2 command a disappear of said simple encapsulation communication records R1 and R2, whereby said communication path P12 is disappeared.

476. (new): A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

said IP transfer network includes plural network node apparatus, a terminal T1 outside of said IP transfer network is connected to a network node apparatus N1 by a logical terminal LP1 via a communication line L1, a terminal T2 outside of said IP transfer network is connected to a network node apparatus N2 by a logical terminal LP2 via a communication line L2,

said terminal T1 transmits an external IP packet 1 for connecting to said terminal T2 by using a telephone number, wherein said external IP packet 1 includes a connection request and a telephone number TN2 of said terminal T2, said external IP packet 1 inputs to said network node apparatus N1 from said logical terminal LP1, said IP transfer network specifies an external IP address EA2 of said terminal T2 from said telephone number TN2 and sends a connection request notification to said terminal T2 having said external IP address EA2,

said terminal T2 transmits a response notification to said IP transfer network, and said IP transfer network sends said response notification to said terminal T1,

said IP transfer network commands a setting of IP communication records R1 and R2 including internal IP address IA1 and IA2 for discriminating said logical terminals LP1 and LP2 for said network node apparatus N1 and N2, and said IP communication records R1 and R2 define a communication path P12 for transferring an internal IP packet between said network node apparatus N1 and N2,

when said terminal T1 transmits an external IP packet 2 of which source address is said external IP address EA2, said external IP packet 2 is judged at network node apparatus N1 whether an IP encapsulation condition is satisfied according to a rule of said IP communication record R1 or not,

when said IP encapsulation condition is satisfied, said external IP packet 2 becomes to an internal IP packet 2 of which destination address is said internal IP address IA2 and is transferred in said communication path P12, and an external IP packet 2 which is restored at said network node apparatus N2 is sent to said terminal T2, and

when said terminal T1 transmits a communication cutting-off request to said IP transfer network, said IP transfer network commands a disappear of said IP communication records R1 and R2, and said communication path P12 is disappeared.

477. (new): A terminal-to-terminal communication connection control method with employment of an IP transfer network according to claim 476, wherein said telephone numbers are substituted for host names.

478. (new): A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

said IP transfer network includes plural network node apparatus, a terminal T1 outside of said IP transfer network is connected to a network node apparatus N1 by a logical terminal LP1 via a communication line L1, a terminal T2 outside of said IP transfer network is connected to a network node apparatus N2 by a logical terminal LP2 via a communication line L2,

said terminal T1 transmits an external IP packet 1 for connecting to said terminal T2 by using a telephone number, wherein said external IP packet 1 includes a connection request and a telephone number TN2 of said terminal T2, said external IP packet 1 inputs to said network node apparatus N1 from said logical terminal LP1, said IP transfer network specifies an external IP address EA2 of said terminal T2 from said telephone number TN2 and sends a connection request notification to said terminal T2 having said external IP address EA2,

said terminal T2 transmits a response notification to said IP transfer network, and said IP transfer network sends said response notification to said terminal T1, said IP transfer network commands a setting of simple encapsulation communication records R1 and R2 including identifiers IA1 and IA2 for discriminating said logical terminals LP1 and LP2 for said network node apparatus N1 and N2, and said simple encapsulation communication records R1 and R2 define a communication path P12 for transferring an internal IP packet between said network node apparatus N1 and N2,

when said terminal T1 transmits an external IP packet 2 of which source address is said external IP address EA2, said external IP packet 2 is judged at network node apparatus N1 whether a simple encapsulation condition is satisfied according to a rule of said simple encapsulation communication record R1 or not,

when said simple encapsulation condition is satisfied, said external IP packet 2 becomes to an internal IP packet including said external IP packet 2 and said identifier IA2 and is transferred in said communication path P12, and an external IP packet 2 which is restored at said network node apparatus N2 is sent to said terminal T2, and

when said terminal T1 transmits a communication cutting-off request to said IP transfer network, said IP transfer network commands a disappear of said simple encapsulation communication records R1 and R2, and said communication path P12 is disappeared.

479. (new): A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

said IP transfer network includes plural network node apparatus, plural terminals are connected to said IP transfer network, a terminal T1 is connected to a network node apparatus N1 by a logical terminal LP1 via a communication line L1, a terminal T2 is connected to a network node apparatus N2 by a logical terminal LP2 via a communication line L2, and said IP transfer network holds a set of a telephone number TN_j (j = 1, 2, 3, . . .) and external IP address EA_j of a terminal T_j, an internal IP address IA_j for discriminating a logical terminal LP_j,

an IP communication record R81 including a discrimination information of said logical terminal LP1 is set in said network node apparatus N1, and an IP communication

record R82 including a discrimination information of said logical terminal LP2 is set in said network node apparatus N2,

said terminal T1 transmits an external IP packet 1 in said IP transfer network for connecting to said terminal T2, wherein said external IP packet 1 includes a connection request and said telephone numbers TN2 and a destination address thereof is a connection control request address EA81 which is an address for transferring an external IP packet in said IP transfer network, and said external IP packet inputs to said network node apparatus N1 from said logical terminal LP1,

said network node apparatus N1 inspects an IP encapsulation condition to be satisfied by an external IP address in said external IP packet 1 according to a rule of said IP communication record R81,

said external IP packet 1 which said IP encapsulation condition is not satisfied is discarded,

when said IP encapsulation condition is satisfied, said network node apparatus N1 encapsulates said external IP packet 1 and inputs it to said IP transfer network as an internal IP packet, said IP transfer network obtains said telephone numbers TN1 and TN2 from said internal IP packet 1 and further obtains an external IP address EA2 of said terminal T2 and internal IP address IA2 for discriminating said logical terminal LP2 by using said telephone number TN2,

said IP transfer network sends an internal IP packet 2 including a receipt notification, said internal IP packet 2 is converted into an external IP packet 2 including said receipt notification at said network node apparatus N2 and then reaches at said terminal T2,

said terminal T2 transmits an external IP packet 3 that includes a call-on notification for notifying a response preparation start and a destination address thereof is said connection control request address EA82, an external IP address of said external IP packet 3 is judged at said network node apparatus N2 according to an IP encapsulation condition defined by said IP communication record R82,

when said IP encapsulation condition is satisfied, and said external IP packet 3 becomes to an internal IP packet 3 including said call-on notification and then inputted to said IP transfer network, said IP transfer network forms an internal IP packet 4 including

call-on notification and sends it, and said internal IP packet 4 becomes to an external IP packet 4 including said call-on notification at said network node apparatus N1 and then reaches at said terminal T1,

said terminal T2 transmits an external IP packet 5 including a response notification for notifying a response, an IP encapsulation condition of said external IP packet 5 is judged at said network node apparatus N2, becomes to an internal IP packet 5 including said response notification and inputs to said IP transfer network, said IP transfer network sends an internal IP packet 6 including said response notification and said external IP address EA2 of said terminal T2, and said internal IP packet 6 becomes an external IP packet 6 including said response notification an said external IP address EA2 of said terminal T2 at said terminal T1 and then reaches at said terminal T1,

said IP transfer network commands a setting of IP communication records R1 and R2 including discrimination information of said logical terminals LP1 and LP2 for said network node apparatus N1 and N2, and said IP communication records R1 and R2 define a communication path P12 for transferring an internal IP packet between said network node apparatus N1 and N2,

when said terminal T1 transmits an external IP packet 7 of which destination address is said external IP address EA2 of said terminal T2, said external IP packet 7 is judged at network node apparatus N1 whether an IP encapsulation condition is satisfied based on administration of said communication record R1 or not,

when said IP encapsulation condition is satisfied, said external IP packet 7 is encapsulated, said encapsulated packet becomes to an internal IP packet 7 that a destination address is said internal IP address IA2 for discriminating said logical terminal LP2 and is transferred in said communication path P12, and it is reversely encapsulated at said network node apparatus N2 and then a restored external IP packet 7 is sent to said terminal T2, and

when said terminal T1 transmits an external IP packet 9 that includes a communication cutting-off request and a destination address is said connection control request EA81, an internal IP packet 9 including said communication cutting-off request is inputted to said IP transfer network, said IP transfer network commands a disappear of said communication records R1 and R2.